

CLAIMS

We claim:

1. A method for enhancing video, comprising the steps of:
- 5 identifying one or more positions in a first image;
- converting said one or more positions to one or more locations in relation to a virtual surface;
- converting said one or more locations in relation to said virtual surface to one or more positions in a second image; and
- 10 enhancing said second image based on said one or more positions in said second image.
2. A method according to claim 1, wherein:
- said virtual surface is a sphere.
- 15 3. A method according to claim 2, wherein:
- said first image and said second image are video images;
- said first image depicts an environment having an actual surface;
- said second image depicts said actual surface;
- 20 said one or more positions in said first image are on an image of said actual surface in said first image;
- said one or more locations are three dimensional locations on said sphere;
- said one or more positions in said second image are on an image of said
- 25 actual surface in said second image;
- said step of enhancing includes editing said second image in relation to said one or more positions in said second image;
- said step of converting said one or more locations is based on camera sensor data; and

4. A method according to claim 1, wherein:  
5 said step of identifying includes using a pointing device to select one or  
more pixels on a monitor.

6. A method according to claim 1, wherein:  
said step of identifying includes selecting a region of said first image.

20           8.       A method according to claim 1, wherein:  
said one or more locations are all on said virtual surface.

10. A method according to claim 1, wherein:  
30 said second image depicts an environment having an actual surface;

said one or more positions in said second image are on an image of said actual surface in said second image; and

said step of converting said one or more locations are performed without knowing a distance between said first actual surface and a camera capturing said  
5 second image.

11. A method according to claim 1, wherein:

said step of converting said one or more locations is based on camera sensor data; and

10 said camera sensor data pertains to an attitude of a camera capturing said second image.

12. A method according to claim 1, wherein:

15 said step of converting said one or more locations is based on camera sensor data and stabilization offset data;

said camera sensor data pertains to an attitude of a camera capturing said second image; and

said stabilization offset data is used to correct said camera sensor data.

20 13. A method according to claim 12, further comprising the steps of: identifying positions of edges;

transforming said positions of said edges to edge locations on said virtual surface;

25 transforming said edge locations to edge positions in said second image using said camera sensor data;

determining said stabilization offset data based on a difference between said transformed edge positions in said second image and actual edge positions in said second image.

30 14. A method according to claim 1, wherein:

said step of enhancing includes adding an enhancement image to said second image and accounting for occlusions of said enhancement image.

15. A method according to claim 14, wherein:

5       said step of accounting for occlusions of said enhancement image includes accessing a color map and editing pixels of said second image according to said color map.

16. A method according to claim 14, wherein:

10       said second image is an image of an environment having an actual surface; and

      said enhancement image appears to be on said actual surface.

17. A method according to claim 1, further comprising the steps of:

15       converting said one or more locations in relation to said virtual surface to one or more positions in a third image; and

      enhancing said third image based on said one or more positions in said third image.

18. A method according to claim 1, wherein:

      said first image and said second image are video images;

      said first image depicts an environment having an actual surface;

      said second image depicts said actual surface;

20       said step of identifying includes annotating an image of said actual surface in said first image, said one or more positions represent said annotation, said annotation is at a first orientation in relation to said actual surface; and

      said step of enhancing includes adding said annotation to an image of said actual surface in said second image at said first orientation in relation to said actual surface.

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19. A method according to claim 18, wherein:

said step of annotating an image includes receiving a set of points from a touch screen.

5 20. A method according to claim 1, wherein:

said step of identifying one or more positions in a first image include identifying a position to add a virtual advertisement;

said step of converting said one or more locations includes determining where to add said virtual advertisement into said second image; and

10 said step of enhancing includes adding said virtual advertisement into said second image.

21. A method according to claim 1, wherein:

15 said step of identifying one or more positions in a first image include identifying a set of positions in an environment, said set of positions bound a virtual advertisement;

said step of converting said one or more positions includes transforming said set of positions in said environment to locations on said virtual surface;

20 said step of converting said one or more locations includes determining where said set of positions are in said second image; and

said step of enhancing includes adding said virtual advertisement into said second image where said set of positions are in said second image.

22. A method for enhancing video, comprising the steps of:

25 determining one or more locations in relation to a virtual surface; and

converting said one or more locations in relation to said virtual surface to one or more positions in a video image.

23. A method according to claim 22, further comprising the steps of:

enhancing said video image based on said one or more positions in said video image.

24. A method according to claim 23, wherein:  
5 said step of enhancing includes adding an enhancement image to said video image and accounting for occlusions of said enhancement image.

25. A method according to claim 22, wherein:  
said virtual surface is a sphere; and  
10 said one or more locations are three dimensional locations on said sphere.

26. A method according to claim 22, wherein:  
said video image depicts an environment;  
15 said video image is captured by a first camera; and  
said step of converting said one or more locations is performed without knowing a position of said first camera in relation to said environment.

27. One or more processor readable storage devices for storing  
20 processor readable code, said processor readable code for programming one or more processors to perform a method comprising the steps of:  
determining one or more locations in relation to a virtual surface; and  
converting said one or more locations in relation to said virtual surface to one or more positions in a video image.

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28. One or more processor readable storage devices according to claim 27, wherein said method further comprises the steps of:  
enhancing said video image based on said one or more positions in said video image.

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29. One or more processor readable storage devices according to claim 28, wherein:

said step of enhancing includes adding an enhancement image to said video image and accounting for occlusions of said enhancement image.

30. One or more processor readable storage devices according to claim 27, wherein:

said virtual surface is a sphere; and

said one or more locations are three dimensional locations on said sphere.

31. One or more processor readable storage devices according to claim 27, wherein:

said video image depicts an environment;  
said video image is captured by a first camera; and  
said step of converting said one or more locations is performed without knowing a position of said first camera in relation to said environment.

32. One or more processor readable storage devices according to claim 27, wherein said method further comprises the steps of:

storing one or more positions in a first image, said step of determining includes converting said one or more positions to said one or more locations in relation to said virtual surface; and

enhancing said video image based on said one or more positions in said video image.

33. One or more processor readable storage devices according to claim 32, wherein:

said first image is a video image;

said first image depicts an environment having an actual surface;

said video image depicts said actual surface;

said step of storing includes storing an annotation of an image of said actual surface, said one or more positions represent said annotation, said annotation is at a first orientation in relation to said actual surface; and

5       said step of enhancing includes adding said annotation to an image of said actual surface in said video image at said first orientation in relation to said actual surface.

34.     One or more processor readable storage devices according to  
10    claim 32, wherein:

said step of storing includes storing a set of positions in an environment, said set of position bound a virtual advertisement;

said step of converting said one or more positions includes transforming said set of positions in said environment to locations on said virtual surface;

15       said step of converting said one or more locations includes determining where said set of positions are in said second image; and

said step of enhancing includes adding said virtual advertisement into said second image where said set of positions are in said second image.

35.     An apparatus for enhancing video, comprising:  
20       video modification hardware; and

one or more processing devices in communication with said video modification hardware, said one or more processing devices perform a method comprising the steps of:

25       determining one or more locations in relation to a virtual surface, and

converting said one or more locations in relation to said virtual surface to one or more positions in a video image.



36. An apparatus according to claim 35, wherein said method further comprises the steps of:

enhancing said video image based on said one or more positions in said video image.

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37. An apparatus according to claim 35, wherein:

said step of enhancing includes adding an enhancement image to said video image and accounting for occlusions of said enhancement image.

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38. An apparatus according to claim 35, wherein:

said virtual surface is a sphere; and

said one or more locations are three dimensional locations on said sphere.

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39. An apparatus according to claim 35, wherein:

said video image depicts an environment;

said video image is captured by a first camera; and

said step of converting said one or more locations is performed without knowing a position of said first camera in relation to said environment.

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40. An apparatus according to claim 35, wherein said method further comprises the steps of:

storing one or more positions in a first image, said step of determining includes converting said one or more positions to said one or more locations in relation to said virtual surface; and

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enhancing said video image based on said one or more positions in said video image.

41. An apparatus according to claim 40, wherein:

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said first image is a video image;

said first image depicts an environment having an actual surface;

said video image depicts said actual surface;

said step of storing includes storing an annotation on an image of said actual surface in said first image, said one or more positions represent said  
5 annotation, said annotation is at a first orientation in relation to said actual surface; and

said step of enhancing includes adding said annotation to an image of said actual surface in said video image at said first orientation in relation to said actual surface.

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42. An apparatus according to claim 40, wherein:

said step of storing includes storing a set of positions in an environment,  
said set of position bound a virtual advertisement;

said step of converting said one or more positions includes transforming  
15 said set of positions in said environment to locations on said virtual surface;

said step of converting said one or more locations includes determining  
where said set of positions are in said video image; and

said step of enhancing includes adding said virtual advertisement into  
said video image where said set of positions are in said video image.

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43. An apparatus according to claim 35, further comprising:

camera sensors;

a gatherer computer, said gatherer computer receives camera sensor data  
from said camera sensors;

25 a time code inserter, said time code inserter receives video and adds time codes to said video; and

a touch screen, said one or more processing devices include a first processor and a second processor, said first processor receives camera sensor data from said gatherer and video from said time code inserter, said first  
30 processor also receives annotation data from said touch screen, said annotation

data relates to a set of positions on said touch screen, said first processor converts said positions on said touch screen to said one or more locations in relation to said virtual surface, said first processor sends drawing information to said second processor, said drawing information is based on said one or more  
5 positions in said video image, said second processor directs said video modification hardware to add one or more annotation image to said video image, said annotation image corresponds to said annotation data, said step of converting said one or more locations is based on said camera sensor data.

- 10 44. An apparatus according to claim 35, further comprising:  
camera sensors, said camera sensors provide camera sensor data to said one or more processors, said step of converting said one or more locations is based on said camera sensor data.

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